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Bird observations on Bali

by J. S. Ash

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In preparation for a planned "Field Guide to the Birds of Indonesia" by several authors, to serve as a companion volume to King *et al.* (1980), E. C. Dickinson (ECD) has drawn up an unpublished checklist based on published reports of the birds of that area. Bali, 5570 km^2, occupies a key position in the region lying across 115°E and just below 8°S off the eastern extreme of Java; it is the most westerly of the Lesser Sundas. Zoo-geographically, however, it possesses an Indo-Malayan avifauna, so that it is also the most easterly point in the Sundas west of Wallacea. The birds of Bali are therefore predominantly of westerly origin and have only a small Australian component, although Bali is separated by only 15–20 miles from the western extreme of Wallacea, namely Lombok, which contains many typically Australian groups.

Bali has been rather poorly known ornithologically, and its western forests have not been thoroughly investigated. Most of the lowland forest has been removed, but extensive areas of primary forest, although decreasing, still remain along the central spine at 1000–2150 m. The main threats to its birds are habitat alteration and increasing persecution by man.

During a visit to the island, 17 August—19 September 1981, and residence there 17 February—29 October 1982, I found 84 species of birds for which there were no previous published records; however 18 of these were included on ECD's list on the basis of 10 sight records by D. A. Holmes (=H), 7 specimens in the Leiden Museum (=L) and a doubtful record in Peters (1964) (=P). Furthermore, Victor Mason (=M) has unpublished sight records predating mine for some of the additions. I do not have details for most of these records, as they have been abstracted from lists, but in the following species' accounts the respective initials H, L, P and M in parentheses indicate that there have been records earlier than my own; they do *not,* however, refer to all the data given in each account.

The main purposes of this paper are to annotate and place these additions on record, and to comment on migration and the need for conservation. To

obviate many tedious details of identification, descriptions have been submitted for each new record to M. D. Bruce, E. C. Dickinson, D. A. Holmes and Dr. D. R. Wells, all of whom have special knowledge of the area and its birds, and I have abided by their decisions on acceptability. A few doubtful records are included because there is only a small element of doubt about each of them and future observers may wish to be aware of the species' possible occurrence. Comments are included on distribution or occurrence in the general area adjoining Bali: in the Greater Sundas to the west, particularly; in the rest of the Lesser Sundas to the east, all within Wallacea; and sometimes in Sulawesi and the Moluccas, also within Wallacea. Borneo, in the Asiatic/Sundaic region, and the Philippines have not been included, and the Australasian region beyond Wallacea is referred to only when relevant.

I have used the distribution data in King *et al.* (1980) and Mackinnon & Wind (1980) for my purpose, although there is often lack of agreement between them. I have also included data from Nusa Penida, referred to as Penida, Lembongan and Ceningan, a group of islands totalling 200 km^2 south-east of Bali, which are administratively part of the main island. The nomenclature and order of King *et al.* is followed, with species not mentioned by them inserted as appropriate.

The inclusion of the following 84 species increases the Bali list by 44% to 274 species.

SPECIES LIST

Oceanites oceanicus Wilson's Storm Petrel. Common in inshore waters, 25.vii.–27.ix, including Penida. Also off Lombok. Little known in the area, but recorded Malacca Straits, Java, Sulawesi, Moluccas to Australasia.

Phaethon lepturus White-tailed Tropicbird. Locally common and presumed breeding, 9.vi.–16.ix, on cliffs of Penida and at Ulu Watu. (M). Known from Bornean seas and Java.

Sula sula Red-footed Booby. One off Seririt, 27.ix.82. On ECD's list, but authority unknown. Well known in the region.

Sula leucogaster Brown Booby. Rather uncommon round coasts, v–x, mostly adults, max. 17 off Ulu Watu. (M). Well known in the region.

Phalacrocorax sulcirostris Little Black Cormorant. Rare visitor. Pesanggaran: 1 on 28.v.82 and again with a *P. melanoleucos* on 3.vi.82. Occurs Java, Wallacea and Australasia.

Fregata spp. Frigatebirds. Very common round the coasts, with large eastward passage mid-vii though x. Sample counts, totalling 1100 birds, showed 1% *andrewsi*, 30% *minor* and 69% *ariel*.

Fregata andrewsi Christmas Frigatebird. Apparently rare. In 1982: Petitenget, 1 on 5.iii; Suwung, 3 on 18.vii. Known from the Greater Sundas.

Fregata minor Great Frigatebird. Very common; main passage ix. (M). Known from the Greater Sundas, Wallacea and Australasia.

Fregata ariel Lesser Frigatebird. The commonest species, with main passage mid-vii through ix. (H). Well known in the region.

Ardea cinerea Grey Heron. Rare visitor. Pesanggaran mangroves, flock of 10 on 2.ix.81, 1 on 16.iv.82; Negara, 1 in padi, 24.ix.82. In Indonesia and Malaysia Grey Herons are mangrove specialists (Wells & Holmes *in litt.*), but this niche is occupied by *A. purpurea* in Bali. Resident in the Greater Sundas, from where these birds probably originated, but rare in the Lesser Sundas.

Ardea novaehollandiae White-faced Heron. Rare visitor from Wallacea or Australasia. Penida, 3 on the shore at Semaya, 4.ix.82, and 1 on dry grassland at Pura Mundi (529 m), 5.ix. Unknown further west.

[*Egretta eulophotes* Chinese Egret. Birds agreeing with the description of this species in King *et al.* (1980) have been seen in Bali, but require further investigation.]

Egretta alba Great Egret. Rare visitor. In 1982: Suwung, 1 on 18.vii and 3.viii and Pesanggaran, 1 on 30.vii. (same bird?); Lake Buyan, 1 on 8 & 27.viii. Resident Greater Sundas, Sulawesi and Australasia, but also recorded Lesser Sundas and Moluccas.

Nycticorax nycticorax Black-crowned Night Heron. Locally abundant and breeds. In 1982: Suwung, a mangrove roost with up to 121 birds, iv-x; Pesanggaran, new-fledged young on

6.v; Teluk Terima, 1 on 25.x. Resident in the Greater Sundas and Sulawesi, but only known from Flores further east.

Ibis cinereus Milky Stork. Rare visitor. Prapat Agung: 1 flew east, 24.x.82, during a migration of raptors. Resident in the Greater Sundas, but from east of Bali known only from Sulawesi.

Plegadis falcinellus Glossy Ibis. Rare visitor in 1982: Petitenget, 3 on 1.iv. and 1 on 7.iv. Resident in Greater Sundas and Sulawesi; Moluccas.

Platalea regia Royal Spoonbill. Rare visitor in 1982: immatures at Pesanggaran, 30.vii. and 4.viii, and flying south off eastern tip of Bali, 28.ix. Resident in the Sundas.

Anas gibberifrons Grey Teal. Locally common in mangroves and on mudflats throughout. (H). No evidence of breeding. Resident in Sundas and Australasia.

Pernis apivorus Eurasian Honey Buzzard. Common autumn passage migrant in the west, 17–26.x.82. *P.a. ptilorhynchus* is resident in the Greater Sundas and is known from Sulawesi and north Irian, and also migrates (e.g. see Smythies 1981).

[*Circaetus gallicus* Short-toed Eagle. One almost certainly this species during raptor migration from the west at Teluk Terima, 26.x. It would be interesting if migrants still reached the resident population in the Lesser Sundas.]

Elanus caeruleus Black-shouldered Kite. Probably frequent visitor to west, where 1–2 were seen on 4 days in iv, ix and x.82. Resident in Sundas.

Accipiter gularis Japanese Sparrowhawk. Common spring and abundant autumn migrant, presumably overwintering, 1.iii.–20.iv. and 19.ix.–26.x.82. (M). East of Bali it is only known from Timor.

Accipter soloensis Chinese Goshawk. Probably uncommon spring but abundant autumn passage migrant. Petitenget, 1 on 11.iv.82; Prapat Agung, 149+, 21–26.x.82. Well known in the Greater Sundas, but east of Bali it is only recorded from Flores in the Lesser Sundas and West Papua (Australasia). Both this species and *A. gularis* must occur further east more frequently than the records suggest.

[*Accipiter badius* Shikra. A probable adult male at Petitenget, 1.ii.82.]

Buteo buteo Common Buzzard. Rare spring and autumn passage migrant. Wangaya Gede, 1 on 31.viii.81; Pesanggaran, 1 on 2.ix.81; Petitenget, 1 on 22.ii.82. It has not been recognised previously south of the Philippines nor east of Java, so that Bali is probably the limit of its southward migration.

Hieraaetus pennatus Booted Eagle. Rare autumn visitor in 1982. Lake Buyan, a pale phase adult, 14.x; Prapat Agung, a pale phase adult, 21.x, and a sub-adult, 25.x. Previously unrecorded south or east of Malaysia, where it is now recognised as a regular migrant south to Singapore.

Hieraaetus kienerii Rufous-bellied Eagle. Rare visitor during raptor migration from the west in 1982. Banyuwedang, 2 flew east, 23.x; Prapat Agung, 1 flew east, 24.x. Resident in the Greater Sundas and in Sulawesi; only known from Sumbawa in Lesser Sundas.

Spizaetus cirrhatus Changeable Hawk-Eagle. Rare visitor. Rangsasa, 1 on 28.viii.81. (L). Resident in the Sundas.

Coturnix chinensis Blue-breasted Quail. Rare. Petitenget. 2♂♂, 17.iv.82. (L). Resident in the Sundas.

Gallus gallus Red Junglefowl. On ECD's list, but authority unknown. Apparently common in higher level woodland and forest in Bedugul and Lake Batur areas above 1125 m and above the range of *G. varius*. Resident in the Sundas.

Turnix sylvatica Little Buttonquail. Petitenget, 1 on 2.ii.82. (L). Resident in the Sundas.

Rallus striatus Slaty-breasted Rail. Rare. Suwung, 1 on 30.ix.82. Resident in the Greater Sundas and Sulawesi, and has occurred in the Lesser Sundas (Timor).

Porzana fusca Ruddy-breasted Crake. Locally common in 1982 up to 210 m, and presumably breeds. In mangroves only iv to mid-ix, elsewhen only in padi. Recorded Pesanggaran, Suwung and Ubud. Resident in the Greater Sundas and Sulawesi, and has occurred in the Lesser Sundas.

Gallicrex cinerea Watercock. Fairly common non-breeding visitor, 1.iii.–1.vii.82, in wide range of habitats: clifftop dry scrub, padi, marsh and beachhead bush. (M). A migrant from further north as far as the Sundas.

[*Gallinula tenebrosa* Black Moorhen. Lake Buyan, several on 8 & 27.viii. 82 which lacked the white on the flanks of *G. chloropus* and were probably this species.]

Porphyrio porphyrio Purple Swamphen. Rare visitor. Lake Buyan, 2 on 12.x.82. (L). Resident in the Sundas.

Pluvialis squatarola Grey Plover. Locally common, iv-x. (H). A visitor to the Sundas and eastwards.

Charadrius dubius Little Ringed Plover. Fairly common autumn passage migrant, 30.vii.–1.x. (H). A visitor to the Sundas and eastward.

Charadrius alexandrinus Kentish Plover. Not numerous migrant, and uncommon breeder. The local birds (*C.a. javanicus?*) are near to *C. ruficapillus* in appearance. 10–12 days-old chick, 3.vi. and a 7–10 days-old chick, 14.vi. (H). Resident in Java, and is known from Sumatra, Sulawesi and E. Papua.

Charadrius mongolus Mongolian Plover. Common, iii–x in one area (peak number 484), but only once elsewhere. (H). A visitor to the Sundas and southward.

Charadrius veredus Oriental Plover. Uncommon autumn passage migrant, 10.ix.–1.x. Nusa Dua, 150 on 15.ix.81; Suwung, 6–13 on 5 days, 10.ix.–1.x.82. A visitor to the Sundas and southward.

Numenius arquata Eurasian Curlew. Uncommon visitor. Suwung and Gilimanuk, 1–2 on 14 days, 7.ii.–27.x.82. (M). A visitor to the Sundas and southward.

Numenius madagascariensis Eastern Curlew. Fairly common, iii–ix, in Suwung area with peak of 25 on 7.iii.82. (M). A visitor to the Sundas and southward.

Numenius sp. A curlew present in the Suwung area, 7.v.–26.vii.82 shared the characters of *N. arquata* and *madagascariensis* and may have been a hybrid.

Limosa limosa Black-tailed Godwit. Uncommon visitor in 1982. Suwung, 1 on 29.iv and 1–3 on 5 days, 13.viii.–1.ix. A visitor to the Sundas and southwards.

Limosa lapponica Bar-tailed Godwit. Uncommon visitor in 1981 and 1982 at Suwung, where 1–3 were seen on 11 days, 7.ii.–30.iv and 22.viii.–14.ix. A visitor to the Sundas and southward.

Tringa totanus Common Redshank. Common locally throughout my visits with peak of 149 on 22.viii.82. (M). A visitor to the Greater Sundas, but further east only known from Timor.

Tringa stagnatilis Marsh Sandpiper. Uncommon migrant, 28.viii.–20.x. in both years. Noted at Pesanggaran, Suwung and Singaraja, max. 14 on 9.ix.82. (M). A visitor to the Sundas and southward.

Tringa nebularia Greenshank. Common throughout my visits, max. 31 in vii. (M). A visitor to the Sundas and southward.

Xenus cinereus Terek Sandpiper. Rare visitor in 1982. Suwung, 1 on 14 & 23.v. and 1 & 3.viii. A visitor to the Sundas and southward.

Heteroscelus brevipes Grey-tailed Tattler. Locally very common throughout my visits, with 100-170 in iv–ix. (M). A visitor to the Sundas and southward.

Gallinago megala Swinhoe's Snipe. On ECD's list, but authority unknown. Status uncertain, but suspected to be fairly common iii–iv. Petitenget, a bird shot on 25.iii.82 with 13 *G. stenura* was examined and identified as *G. megala*. A visitor to the Sundas and southward.

Calidris canutus Red Knot. Rare visitor. Suwung, 2 on 2.vi.82. A visitor to the Greater Sundas and known from Sulawesi.

Calidris tenuirostris Great Knot. Rare visitor in spring and autumn 1982. Suwung, 2 on 21.iii, 1 on 24–25.viii and 10.ix. Presumably the main route out of the Palaearctic lies still further east. Visitor to the Sundas and southward.

Calidris ruficollis Rufous-necked Stint. Locally abundant throughout my visits, with large non-breeding population in summer. Max. 406 in v. Usually on shore and rarely in padis. Visitor to Sundas and southward.

Calidris subminuta Long-toed Stint. Locally abundant spring and autumn passage migrant, 16.iii.–8.iv. and 13.vii.–1.x.82. Max. 500 in spring, 27.iii. and 200 in autumn, 25.viii. Most were in remigial moult in autumn. Unlike *C. ruficollis*, is almost entirely restricted to the padis. In this area known only from Sulawesi and the Greater Sundas and southward.

Calidris acuminata Sharp-tailed Sandpiper. Locally fairly common spring passage migrant in 1982, 19.iii.–5.iv, and once in vi. Peak of 15 on 22.iii. at Petitenget. A visitor to the Sundas and southward.

Calidris ferruginea Curlew Sandpiper. Very common throughout my visits including non-breeding birds. Max. 300 in iii, 400 in viii and 1000 in ix. A visitor to the Sundas and southward.

Crocethia alba Sanderling. Fairly common throughout my visits; max. 37 on 26.vi.82. (H). A visitor to the Sundas.

Philomachus pugnax Ruff. Rare autumn passage migrant. Suwung, ♀, 12 & 16.ix.81; ♂, 25.viii.82. Not previously recorded in the Sundas or in Wallacea beyond the Philippines; Australia.

Himantopus himantopus Black-winged Stilt. Uncommon visitor in 1982, iv–x. Suwung,

3 on 30.iv, 1 on 22.vi. and 30.vii.–1.x, 2 on 20.ix. *H. h. leucocephalus* is resident in Greater Sundas and Australasia; known from Lesser Sundas.

Phalaropus lobatus Red-necked Phalarope. Autumn visitor. 15 on sea, 27.ix.82, from Penuktukan to Kuba on north coast. Known from Sulawesi, Moluccas, Lesser Sundas and Australasia. Smythies (1981) refers to it as offshore from Bali, 16–17.xi.54.

Stercorarius pomarinus Pomarine Jaeger. Probably regular spring and autumn passage migrant. In 1982, Petitenget, 1 on 25.iii; Seririt, 4 on 27.ix; Tianyar, 3 on 27.ix. Not previously recorded from the Sundas, but is known from Penang, Sulawesi and Australasia.

Stercorarius parasiticus Parasitic Jaeger. Probably fairly common spring passage migrant. 6 records of pale phase adults, 24.iv.–8.v.82, seeking out flocks of migrating *Childonias leucopterus* along the shore. Suwung, 2 on 24 & 28.iv, 1 on 29.iv. and 8.v. Unrecorded in the region south of Borneo.

Chlidonias hybrida Whiskered Tern. Not uncommon autumn passage migrant, ix–x. Pesanggaran, 10 on 2.ix.81; in 1982 at Suwung, 5 on 17.ix; Kapal, 7 on 12.x; Singaraja, 3 on 20.x. Resident in Sulawesi and Australasia, and known from Greater Sundas and Moluccas.

Chlidonias leucopterus White-winged Tern. Locally common spring and autumn passage migrant in 1982, 7.iii.–1.v. and 30.ix.–27.x, and probably overwinters. Large passage E/ENE out to sea from E. coast, 24–29.iv. Known from the Greater Sundas and Sulawesi, and breeds in Australasia.

Sterna hirundo Common Tern. Common in 1982 as spring and autumn passage migrant, and presumed winter visitor. Noted in hundreds all coasts, 7.iii.–25.iv. and 9.ix.–29.x. A visitor to the Sundas.

Sterna anaethetus Bridled Tern. Uncommon visitor 1981-2, 23.viii.–29.x. Legian, 3 on 23.viii.81. In 1982, Teluk Terima, 1 on 26.ix; Penuktukan, 2 on 27.ix; Legian, 20 on 29.x. Resident Sulawesi and Greater Sundas, and known from Lesser Sundas.

Sterna albifrons Little Tern. Very common 1981–2, 7.iii.–4.iv and 29.vii.–17.x, and probably overwinters; often over 100 together. (H). Known from the Sundas and breeds in some areas.

[*Anous minutus* White-capped Noddy. Probably uncommon visitor; 1–2 small *Anous* sp. on 4 occasions 15–27.ix.82 off Lembongan and north coast.]

Ducula aenea Green Imperial Pigeon. Rare, except in one area. In 1982: Bali Barat, 2 on 24.ix, 1 on 26.ix. and 19.x; Penida, 22+ at Temiling and 30 at Saren, 3.ix, common near Batumadeg, 5.ix. (L). Under grave threat due to shooting on Penida. Resident in Sundas.

Eudynamys scolopacea Common Koel. Rare and local in 1982. Megali, 2 taken and hand-reared to full-grown; Penida, 1–6.ix, a male at Temiling and a pair near Batumadeg. (M, at Ubud). Resident in Sundas and beyond.

[*Aerodramus brevirostris* Himalayan Swiftlet. Rare visitor, probably this sp. or possibly *A. maxima*. Suwung, 1 on 17 & 22.ix. Resident Sumatra, Philippines and Papua New Guinea.]

Aerodramus vanikorensis Mossy-nest Swiftlet. Common round mountain forests, but descends to lower ground in evenings. Occurs Rangsasa, Petitenget, Suwung, Pesanggaran, Wangaya Gede, Tamblingan, Lake Buyan, Banyuwedang. Resident Sulawesi, Lombok, Moluccas and Australasia.

[*Aerodramus spodiopygea* Australian Swiftlet. Rare visitor, probably this sp. or possibly an eastern white-rumped race of *Collocalia esculenta*. Suwung, 2 on 21.iii.82.]

Hirundapus cochinchinensis White-vented Needletail. Rare. Teluk Terima, 2 on 26.x.82. Only previously recorded from Sumatra in this region.

Hirundapus giganteus Brown Needletail. Uncommon. Mangissari, 2 on 29.viii.81, 4 on 16.vi.82; Puckasari, 1 on 16.vi.82; Prapat Agung, 1 on 25.ix.82; Payangan, 3 on 6.x.82. Resident on Greater Sundas and Sulawesi.

Apus pacificus Fork-tailed Swift. Abundant passage migrant and presumed winter visitor. Unrecorded 11.iv.–23.ix. Huge eastward autumn immigration from Java. (H). Known from Sundas to Australasia.

Apus affinis House Swift. Fairly common and widespread 1981-2, iii–ix; presumably resident. Noted Pekutatan, Ubud, Ulu Watu, Petitenget, Teluk Terima, Prapat Agung, Nusa Penida, Lake Buyan and Legian. Resident in Sulawesi and Greater Sundas, but nowhere else in region.

Picoides moluccensis Brown-capped Woodpecker. Rare. Sumberklampok, 1 on 26.ix.82. Resident in Sundas. On ECD's list, but authority unknown.

Hirundo tahitica Pacific Swallow. Common and widespread on coast and inland; breeds. (H). Resident in Sundas and eastward.

Hirundo daurica Red-rumped Swallow. Fairly common 11–18.iv. and 25.viii.–26.x. 1–5

seen 1981–2 at Klungkung, Anturan, Banyuwedang, Gilimanuk, Penelokan, Prapat Agung, Teluk Terima, possibly resident or intra-Sundas migrant or both. Known from Greater Sundas, resident in Lesser Sundas.

Delichon dasypus Asian House Martin. Rare autumn passage migrant and possible winter visitor. Near Banyuwedang, 1 on 18 & 23.x.82 flew east with migrant raptors; distinguished from *D. urbica* by dusky white underparts. Recorded previously from Java, but otherwise unknown south of Malaya and Sulawesi.

Pycnonotus aurigaster Sooty-headed Bulbul. Locally uncommon (introduced?) along southern coast at Sanur, Nusa Dua, Ulu Watu, Petitenget; presumably breeds. (M, at Ubud). Resident in Java, and introduced into Sumatra and Sulawesi.

Dicrurus paradiseus Greater Racket-tailed Drongo. Rather rare, 1982. Tamblingan, 1 on 6 & 10.viii; Bedugul, 1 on 8.viii; Teluk Terima, 1 on 19.x. (L). Resident in Greater Sundas, but unknown eastwards.

Zoothera dauma Scaly Thrush. The original source of the record in Peters (1964) has not been traced. Rare at 1220–1280 m. Bedugul, 1 on 8.viii. and 2 on 14.x.82 at different sites. (P). Resident in the Sundas.

Zoothera andromedae Sunda Ground Thrush. Rare at 1200–1280 m in 1982. Tamblingan, 1 on 9.viii, Bedugul, 1 on 14.x. Resident in the Sundas.

Locustella ochotensis Middendorf's Warbler. Rare visitor. Suwung, 1, probably 2, on 27.x.82 in padi. Its dark colour without any streaking or rufous colouration indicates the race *L. o. pleskei*. Recorded from Wetar in the Lesser Sundas, but otherwise unknown south of Sulawesi and Borneo.

Muscicapa latirostris Asian Brown Flycatcher. Rare visitor. Teluk Terima, 1 on 24.x.82. Known from Sulawesi and the Greater Sundas.

[*Anthus* sp. A small unidentified pipit walking about on a large branch of a high tree at Tirtagangga, 26.viii.81, may have been either *A. hodgsoni* or less likely *A. gustavi*.]

[*Aplonis minor* Lesser Glossy Starling. On ECD's list, but authority unknown. Doubtfully recorded in 1982: Wangaya Gede, 2 on 21.iv; Lake Bratan, 1 on 9.vii; Tamblingan, 2 on 6.viii. Resident in Java, Lesser Sundas and Moluccas.]

Acridotheres javanicus White-vented Myna. Fairly common throughout my visits, at 0–210 m. All the dark mynas seen, except *Gracula religiosa*. are included under this species: they varied from nearly black to greyish-brown (juveniles?) and generally showed little white on their undertail coverts. Resident in Sulawesi and Greater Sundas.

Arachnothera longirostra Little Spiderhunter. Uncommon and local at 207–830 m in 1982; presumably breeds. Wangaya Gede, 2 on 21.iv; Ubud, 1 on 12 & 12.vi, and 1 daily 4–11.x. (M). Resident in Greater Sundas.

Ploceus philippinus Baya Weaver. At least 4 nests in coconut palms at Sanur in 1982 differed from those of *P. manyar*, having much longer funnels and being more finely woven. A male had a black mask confined to the lores, around eye, and ear coverts, but a clearly spotted breast like *manyar*.

Lonchura molucca Moluccan Munia. Locally very common, 1–6.ix.82, on Penida and Lembongan, outnumbering *L. leucogastroides* by 185:108. A Wallacean endemic resident in the Lesser Sundas, where it is not known from west of Sumbawa.

MIGRATION

With few exceptions information from Bali on migration is sparse, in particular of migrant species of Sylviidae and Muscicapidae. My sighting were rare, possibly because these normally late migrants may have arrived in both years after my departure, and in 1982, although I was present February–April I spent most of the time in coastal areas unsuitable for passerine migrants. However, a spectacular migration of raptors was discovered, and this is discussed below together with briefer notes on the migratory status of some other species.

Raptors

Impressive numbers of raptors arrived from Java in the Gilimanuk/Banyuwedang area of NW Bali in late October 1982. They continued on into Bali on an E/ESE course. In counts on 7 mornings in the period 17–26 October the following species were observed: *Pernis apivorus* Eurasian Honey Buzzard, total 119 (peak: 42 on 21st), with 66% of the birds in the

period 08.00–09.30 hrs, usually flying singly (56%), but occasionally up to 6–7 together; both adults and immatures were present, and c.4% were dark-phase birds. *Elanus caeruleus* Black-shouldered Kite, 2 noted accompanying passing migrants. *Circaetus gallicus* Short-toed Eagle, one, almost certainly this species, arrived low over the sea at 07.15 on 26th. *Accipiter gularis* Japanese Sparrowhawk, total 343 (peak: 108 on 18th), with 86% fairly evenly distributed between 08.00 and 10.30, many flying singly (48%), but others in flocks of up to 32 birds. *A. soloensis* Chinese Goshawk, total 153 (peak: 92, +19 which were more probably this species than *gularis,* on 26th; i.e. a week later than *gularis*), with 53% concentrated in the period 09.00–09.30, and fewer flying singly (35%), but others in flocks of up to 21 birds. *Hieraaetus pennatus* Booted Eagle, 1 on 21st and 25th with the other migrants. *H. kienerii* Rufous-bellied Eagle, 2 on 23rd and 1 on 24th with the other migrants.

Presumably the northern raptors crossing from Java are a continuation of the large numbers passing south through Malaysia in autumn (Medway & Wells 1976), but it is possible that this stream of birds, by the time it reaches Bali, has been augmented by others from Borneo and even Sulawesi. The present observations are inadequate to postulate the ultimate destination of these migrants, although it is improbable that many of them remain in Bali. *Pernis* has been recorded once before, on 15 April 1973, in Bali (by D. R. Wells), but an interpretation of the situation in Indonesia is complicated by the presence of resident *P. a. ptilorhynchus,* which also migrates, in the Greater Sundas, Sulawesi and North Irian. Indeed, it is also possible that some of the birds entering Bali may have originated in western Indonesia.

A. gularis breeds in NE Asia and overwinters south to Borneo and the Greater Sundas. Presumably it overwinters in Bali also, but no doubt many of those arriving there in October move on further east, in spite of there being only one record (from Timor). Probably it has been overlooked, for there are no previous records from Bali either. I saw none in Bali in February, and then at least 12 sightings, 1 March–20 April, indicating a return passage and strengthening the suggestion that most autumn arrivals pass through to destinations further east. The situation for *A. soloensis* is probably very similar, although east of Bali it is only known from Flores and West Papua. I have one spring record in Bali, on 11 April.

Buteo buteo Common Buzzard was not seen during the raptor counts, but the 3 recent records indicate that Bali is probably the limit of its southward migration. It is altogether rare in the region, occurring in Malaysia and Java only and not at all in Borneo. Booted Eagles, as with other migrant raptors, have probably been overlooked, and it is only recently that they have been recognised as regular migrants to Malaysia and south to Singapore. *H. kienerii,* previously unrecorded in Bali, behaved as if on migration, but were not actually seen over the sea. The only evidence I have found for migration in this species is that I. C. T. Nisbet saw one moving, interestingly, with migrating *Pernis* in Malaysia (D. R. Wells).

The birds counted in NW Bali were an unknown fraction of the total involved. They were known to be travelling on a front several kilometres wide, and although many were flying low down there were many at a great height, particularly the Accipiters, invisible to the naked eye and sometimes

overhead at the extreme range of 10 x 40 binoculars (presumably at over 3000 m).

WADERS

There was little sign of visible migration, but this could have been overlooked in the large movements of waders overland each morning and evening. Over a large part of SE Bali all the waders on the extensive padis move eastward towards the coastal mudflats for the night. However, seasonal changes in numbers at certain sites provided an indication of when migration occurred, although on the coast even this situation is confused by the large numbers of non-breeding northern waders remaining through the boreal summer. D. R. Wells writes that "Malaya has very few waders indeed in June and where the big influxes of second summer birds come from in late July to August has always been a mystery". Possibly some come up from Indonesia; this would imply a northward trans-equatorial migration at a time of the year when adults from further north are already arriving in the south. Such a situation would conceal any population changes during this period in Bali. Frequent counts, indeed, at a high-tide wader roost on Bali, April–October, showed no major changes in overall numbers which could not be accounted for by other than new arrivals, e.g. a large passage of *Calidris ruficollis* Rufous-necked Stints in late May, and a large arrival of *Charadrius mongolus* Mongolian Plovers in August. In June, when the situation was likely to be most stable, there were still present up to 750 waders of 16 species at the roost.

Frequent counts covering 200 ha of rice padis, March–October, provided better information on periods of passage, particularly for those species for which this was their preferred habitat. As examples, peak *Tringa glareola* Wood Sandpiper passage in spring was in the last half of March with numbers up to 2000 in the last week; *Calidris subminuta* Long-toed Stint spring passage was between 15 March and 8 April, peaking at c. 500 at the end of March; *C. acuminata* Sharp-tailed Sandpiper passage in spring was confined to the period 19 March–5 April.

On one occasion 16 *Gallinago stenura* Pintail Snipe departed together in a party from a padi at sunset and were followed until out of sight as they rose high, flying away due north.

In summary, Bali with its extensive areas of tidal flats and irrigated padis, is an important staging post for waders on passage and for oversummering and overwintering waders. At peak periods total numbers on the island must be far in excess of 10,000.

OTHER SPECIES

Gallicrex cinerea Watercocks were fairly common non-breeding visitors in a wide range of habitats, 1 March–1 July. Sightings of 15 *Stercorarius* skua spp. in spring and autumn, including a probable *S. longicaudus,* is an unprecedented occurrence in SE Asia, and suggests that they have been overlooked elsewhere. Tern passage was notable, including movements of: *Chlidonias hybrida* Whiskered Tern September–October; *C. leucopterus* White-winged Tern March–May, when large compact flocks flew eastwards, and again September–October; *Gelochelidon nilotica* Gull-billed Terns, with spring passage until 22 May, and again from 12 August; *Sterna hirundo* and *albifrons* Common and Little Terns (see species list); and *S. bergii* Great Crested Terns August–September, when large numbers moved eastward.

Cacatua sulphurea Lesser Sulphur-crested Cockatoos arrive irregularly in large numbers in irruptions from the east. Migrant cuckoos recorded included *Cuculus saturatus* Oriental Cuckoo and *Chrysococcyx basalis* Horsfield's Bronze Cuckoo, the latter confined to brief periods, 25–28 May and 15–19 August; but owing to difficulties of identification much more investigation is required. *Hirundapus cochinchinensis* White-vented Needletail was recorded only once. *Apus pacificus* Fork-tailed Swifts were abundant (absent 11 April–23 September) passage migrants and presumed winter visitors; huge numbers, many at a great height, arrived in NW Bali from the direction of Java during raptor migration at the end of October. Austral migrant *Halcyon sancta* Sacred Kingfishers were locally common 16 April–9 September, with only a few thereafter. Migration of *Merops philippinus* Blue-tailed Bee-eaters was eastwards through Bali on a broad front; they were abundant from the second week of August and birds were seen in coastal areas arriving from Java in western Bali, leaving Bali eastward, and arriving on Nusa Penida from Bali. There was a movement of *Rhyticeros undulatus* Wreathed Hornbills September–October, up to 36 birds in a day, between NW Bali and Java, and *vice versa,* but this was judged to be daily commuting between feeding areas.

There were sightings of 7 *Pitta guajana* Banded Pittas, which may have been distant migrants from mainland SE Asia, in the short period 19–25 October. *Hirundo rustica* Barn Swallows were abundant passage migrants and winter visitors, 13 August–20 April, and there were 2 autumn *Delichon dasypus*. Records of *Locustella ochotensis* Middendorf's Warbler and *Muscicapa latirostris* Asian Brown Flycatcher are given in the species list. *Motacilla flava* Yellow Wagtails were presumed winter visitors, common in padis, 12 September–20 April, and a probable *Anthus hodgsoni* Olive Tree Pipit was noted. *Lanius cristatus* Brown Shrikes were uncommon presumed winter visitors or passage migrants or both, in March and October.

NEED FOR CONSERVATION

As mentioned earlier, the main threats to birds on Bali are habitat alteration and persecution by man, especially in the heavily populated eastern half of the island, which ecologically is almost entirely altered by man's activities. Of the species recorded in the past, 24 were not seen in 1981 or 1982, although most of these apparently were vagrants or casual visitors; but notable omissions were *Ptilinopus porphyreus* Crimson-crowned Fruit Dove, *Trichoglossus haematodus* Rainbow Lorikeet, *Phodilus badius* Bay Owl, *Anthrococeros convexus* Southern Pied Hornbill, *Dryocopus javensis* White-bellied Woodpecker and *Pycnonotus atriceps* Black-headed Bulbul. All of these may have disappeared with the destruction of lowland forest, but pigeons, doves and parrots are particularly harassed by man.

Habitat destruction or alteration, although beneficial to some species, is undoubtedly detrimental to others, and continued deforestation—although controlled to some extent on Bali—will have a serious affect in the future on the ecology of the island and the welfare of its rapidly increasing human population. Human persecution is on an increasing scale through widescale trapping for cage-birds and shooting for food and sport throughout the year. Presumably this has partly resulted from socio-economic changes which have degraded the former protective element inherent in the traditional adherence to the particular Balinese form of Hinduism. To this can be added the increased affluence brought about by the tourist trade resulting in large

numbers of motorised gun-owners having easy access to the countryside. Law enforcement, even within the National Park, is almost entirely ineffective in spite of the good intentions of the staff, and there would appear to be no gun control at all except for a restriction on bore-size (yet even eagles are killed with airguns).

There can be few Balinese households without a caged bird, and frequently there are many in one house, often including a wide diversity of species. There is a flourishing, and presumably largely illicit, export trade in caged birds. High prices offered in the lucrative markets of Japan, elsewhere in SE Asia and in Saudi Arabia, encourage this trade.

The endemic *Leucopsar rothschildi* Rothschild's Starling is greatly endangered. It is confined to a small area in the Bali Barat National Park, and is under serious threat due to the price on its head, equivalent to about US $130 for a live bird in 1982 and to the activities of at least 8 birdcatchers actually resident in the Park, as well as to ineffective protection. I obtained direct evidence of trapping of this species with the use of a decoy and 'bird-lime'; another technique reported involves the use of a live cat, suspended by a hind leg from a tree, whose calls attract this bird. The birds caught are offered for sale and I have seen as many as 16 together in cages—the property of one man. The activities of all these people are known to the authorities, but it does not seem to be possible to take effective action. The largest number of *L. rothschildi* I saw together in 1982 was 26 in a day-time roost with *Sturnus contra* and *melanopterus,* but a birdtrapper was active in the roost at the time with a decoy and limed sticks. It is hard to believe that the species can exist for much longer in the wild, and probably little can be done at this stage to save it. Any scheme to release birds in the wild will merely greatly benefit the local birdcatchers and those who support them.

Columbids which congregate on fruiting trees are particularly vulnerable to trappers and shooters. On Nusa Penida it is remarkable that some species still survive at all. *Ptilinopus melanospila* Black-naped Fruit Dove, of which there may be less than 10 surviving there (only one pair was found even on mainland Bali) and *Ducula aenea* Green Imperial Pigeon, of which there are probably only 200–300 (only 4 were seen on the mainland), must have been greatly reduced by a visiting party of shooters from Bali who killed over 200 pigeons in one week-end in 1982 (*per* R. Beudels).

The outlook is at best gloomy for many species under the pressure of a large and increasing human population. For adequate bird protection and conservation no half-way measure is likely to be effective. Only complete protection along the following lines can succeed:—

- — a total ban on the use of fire-arms out-of-doors;
- — a total ban on the capture, injuring or killing of any wild bird by any means, including use of decoys, liming, trapping, snaring, netting, shooting, use of catapults, blowpipes, etc., and the taking of nestlings;
- — a total ban on the possession of caged wild birds;
- — a total ban on the import and export of any wild bird, as well as on the transit through Bali of birds caught elsewhere;
- — a realistic controlled and managed programme for the exploitation of the nests of *Aerodramus fuciphaga* (currently over-exploited);
- — effective law-enforcement.

FURTHER WORK

Ornithologically Bali has been a much-neglected island, as the above results will show. Much remains to be done, particularly in terms of observational studies, and undoubtedly there remain significant discoveries to be made similar to the recognition of the large raptor passage in autumn 1982 and the finding of Wallacean species on Nusa Penida—*Lonchura molucca* for the first time and the confirmation that *Dicaeum maugei* Blue-cheeked Flowerpecker and *Zosterops chloris maxi* Mangrove White-eye are still present there.

For the increasing number of ornithological visitors to Bali it is worth indicating some of the studies that might be undertaken and some problems requiring elucidation.

Nusa Penida, especially its south coast cliffs, needs detailed survey, as do the Highland Forests; sea-watches would be very profitable and the breeding status of *Phaethon lepturus* needs investigating; raptor counts in E Java, NW and E Bali, preferably co-ordinated, would add much knowledge; the confused situation over the status and identification of egrets, and also of cuckoos, needs elucidating; the respective status and habitat preferences of the trillers *L. sueurii* and *nigra*. of which the latter may also occur in the west, need investigating, as also does the distribution of the newly discovered *Ploceus philippinus* Baya Weaver in palms at Sanur in relation to *P. manyar*; and the starlings and mynas need plumage/age related and taxonomic studies.

Of the swiftlets, at least 6 distinct taxa occur on Bali, including:– *Collocalia esculenta*, a very common resident; *Aerodramus fuchiphagus*, a local resident; *A. vanikorensis*, seen once (but possibly *A. maxima*); *A. spodiopygea*, seen once (but possibly an eastern white-rumped race of *C. esculenta*). Much more work is required to establish identifications and status, preferably with the collection of specimens.

So far, 4 populations of *Trichastoma* babblers have been located all of which were regarded as *T. sepiarium*, though probably more than one species is involved:– at Bedugul at 1280 m, at Wangaya Gede at 830 m, at Ubud at 270 m, and at Teluk Terima near sea-level. The birds at Wangaya Gede are darkest, with greyish-black crowns and white throats, and call with a series of 4–5 notes, of which the first is soft followed by 3–4 louder ones; at Ubud they are not so dark on the crown and their calls are a hoarse "kwick-kwick- . . ."; at Teluk Terima they feed in more open ground on the woodland floor and have the head area only slightly greyer than the mouse-brown upperparts, with a very faint pale supercilium, whitish-buff throat, whitish-buff on the centre of the underparts, warmer buff flanks and undertail coverts, dark short tails and pale legs. The possibility of *T. pyrrhogenys* occurring, or even a new species, needs to be explored, but there is much geographic variation in both *sepiarium* and *pyrrhogenys*.

I shall be happy to provide more detailed information on any of the above p oblems, which so urgently need investigation, as well as supply a map of the 87 10 km-grid squares (8°S and 115°E used as baselines) of Bali, of which 82 contain very variable amounts of data.

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Appendix.

Gazetteer of localities in Bali. Latitudes are shown as degrees and minutes South, Longitudes as degrees and minutes East.

Locality	*Coordinates*	*Alt.(m)*	*Locality*	*Coordinates*	*Alt.(m)*
Anturan	8.09, 115.03	0–25	Penelokan	8.16, 115.22	1225
Bali Barat	N.W. Bali		Penuktukan	8.08, 115.23	20
Banyuwedang	8.08, 114.34	<10	Pesanggaran	8.43, 115.13	0
Batumadeg	8.45, 115.32	300	Petitenget	8.41, 115.09	0
Batur, Lake	8.15, 115.25	1125	Prapat Agung	8.08, 114.28	0–310
Bedugul	8.17, 115.10	1200	Puckasari	8.18, 114.58	730
Besakih	8.22, 115.27	950	Pura Mundi	8.43, 115.32	529
Bratan, Lake	8.17, 115.11	1220	Rangsasa	8.17, 114.39	900
Buyan, Lake	8.15, 115.07	1200	Sanur	8.41, 115.15	0
Celukanbawang	8.12, 114.50	0	Saren	8.46, 115.30	250
Ceningan	8.42, 115.27	0–100	Semaya	8.44, 115.37	25
Gilimanuk	8.10, 114.26	0	Seririt	8.11, 114.56	0
Kapal	8.35, 115.10	100	Singaraja	8.07, 115.06	0–30
Klungkung	8.32, 115.24	100	Sumberklampok	8.10, 114.29	<25
Kubu	8.15, 115.34	35	Suwung	8.42, 115.14	<10
Legian	8.43, 115.10	0	Tamblingan	8.16, 115.06	1200
Lembongan	8.41, 115.27	0–50	Teluk Terima	8.09, 114.32	0
Mangissari	8.22, 114.53	500	Temiling	8.46, 115.30	280
Negara	8.22, 114.37	10	Tianyar	8.12, 115.30	<10
Nusa Dua	8.48, 115.14	0	Tirtagangga	8.24, 115.36	350
Nusa Penida	8.45, 115.30	0–529	Ubud	8.31, 115.16	207
Payangan	8.26, 115.14	400	Ulu Watu	8.50, 115.05	100
Pekutatan	8.26, 114.50	20	Wangaya Gede	8.22, 115.06	830

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Books Received

Brush, A. H. & Clark, G. A. Jr. (Eds.). 1983. *Perspectives in Ornithology.* Pp. 560. Cambridge University Press. £20 ($29.95).

Essays presented for the Centennial of the American Ornithologists' Union. Ernst Mayr provides an Introduction and a scholarly appreciation of the 13 chapter topics, which "provide modern perspectives of some of the major scientific problems of modern ornithology", besides offering his own comments on additional aspects. The Editors, who are to be sincerely congratulated on their careful work, have tried to choose from a "staggering" selection of topics those which emphasised new research areas or subjects undergoing significant change, the authors being encouraged to reflect, provoke and be as controversial as they might wish. Most chapters have several pages of additional commentary from one or even two authors expert in the same field, but not necessarily with the same views. The Editors' approach appears to have been suitably responded to by the 33 authors, who must form an important portion of international ornithological expertise, mainly and appropriately in this context from the U.S.A. The chapter topics cover a wide field, from, for example, mating systems, navigation, ecological energetics to song learning, micro-evolutionary processes, biogeography and so on. The whole, regretted by the Editors as